# Window Retrofit Guide

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# Retrofit Windows Guide

The Retrofit Windows Guide will be produced by Pacific Northwest National Laboratory (Marye Hefty, Project Lead)

The purpose of our retrofit windows guide is

- to communicate the absolute do's and don'ts when retrofitting windows (from a whole-house and building science approach).
- to communicate to contractors and interested homeowners that all retrofits need to be completed by skilled people who understand whole-house building science (because of the potential problems, health, and safety issues with any energy upgrade) and
- to communicate DOE's Building America research and results in a forum/style that is accessible to the builder/contractor

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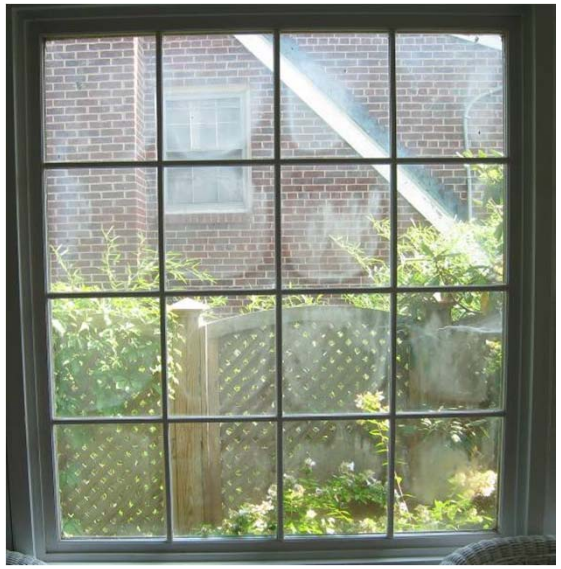
# Why Retrofit Windows?

Improve energy efficiency of your home

Improve comfort of your home

As part of renewal (damage) and up-dating (aesthetics) of your home.



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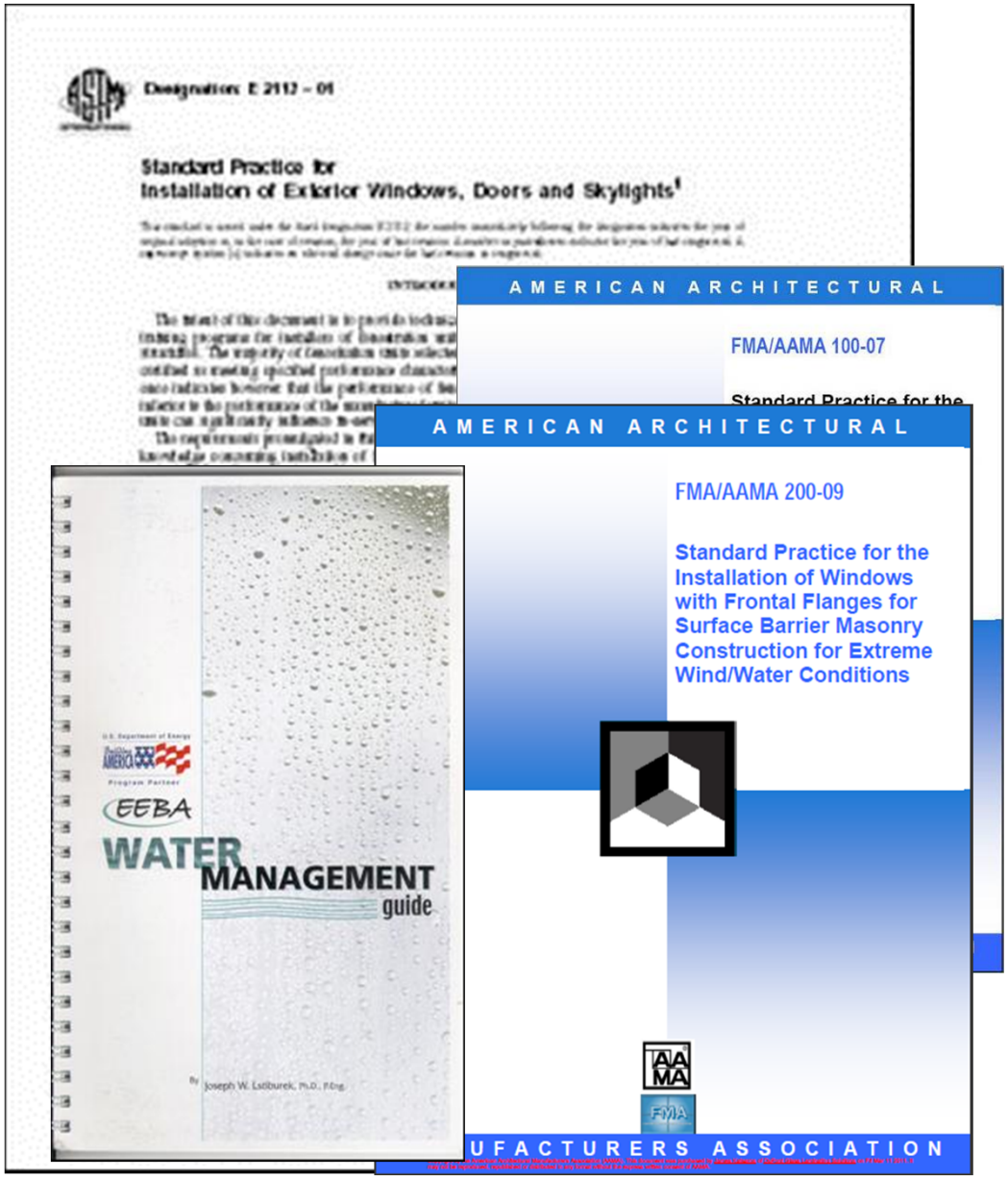
# New Construction

Basic Path:

- Select the right fenestration product for the task – including considerations such as exposure /climate / attachment…
- Prepare the rough opening to ensure the product will properly fit
- Integrate the rough opening with the water resistive barrier (WRB), which provides air / water protection to the building envelope
- Install the fenestration product into the rough opening, ensuring proper functioning (plumb / level / square & ensure proper operation)
- Ensure complete integration between the fenestration product and building envelope (WRB) through correct lapping and sequencing of flashing & sealant materials

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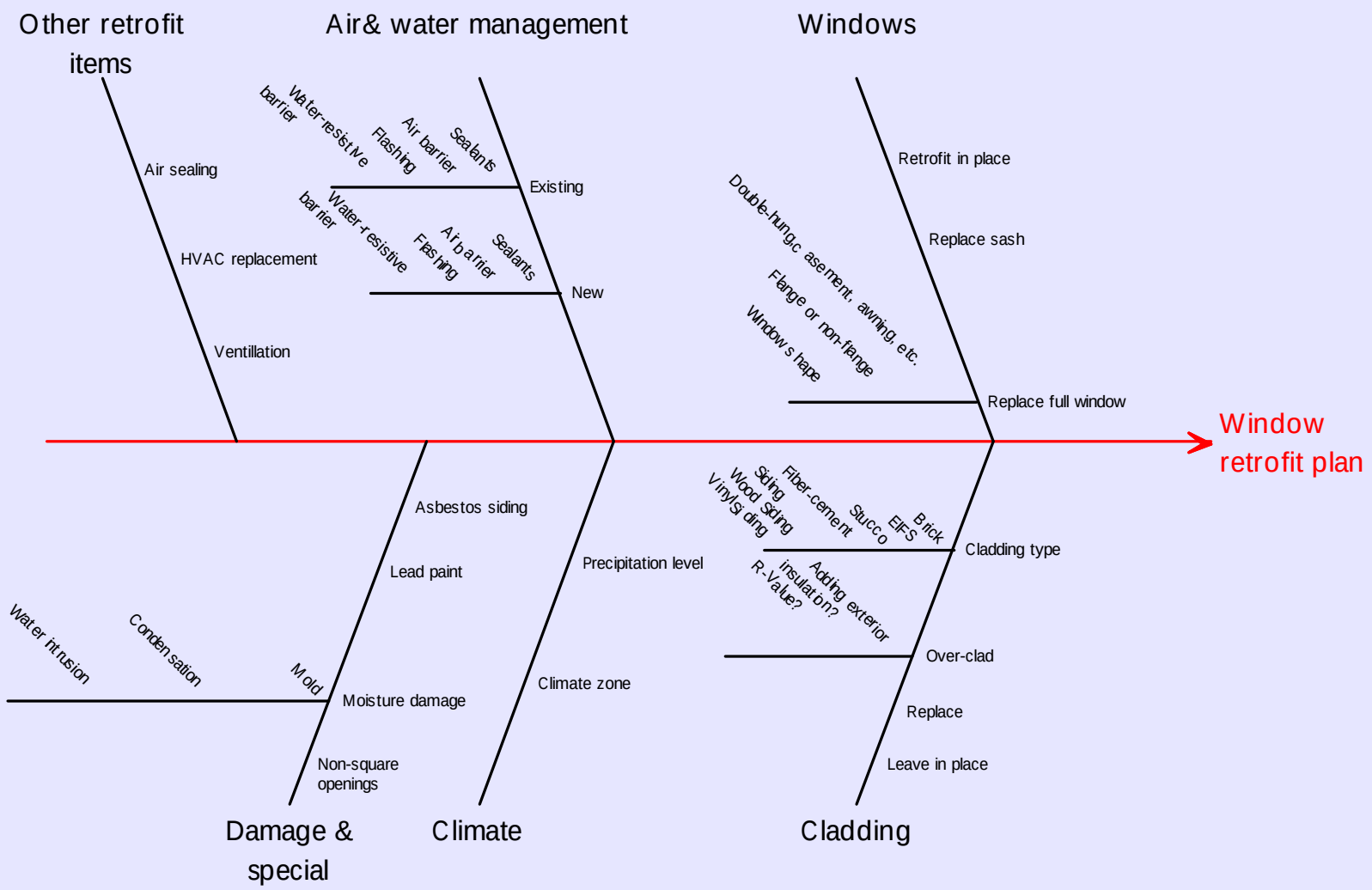
# Window Retrofit Variables

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# Window Retrofit:  General Considerations

It is advisable to follow a process that will define and plan the individual retrofit project.

- Choose product and materials that are suitable for your home and your climate.
- Understand the retrofit scope
- Correct any damage and/or defects in the existing construction.
- Establish continuity of the air, water and thermal management with the wall system to extent possible considering the retrofit scope.
- Understand the effect of changing the window on other systems

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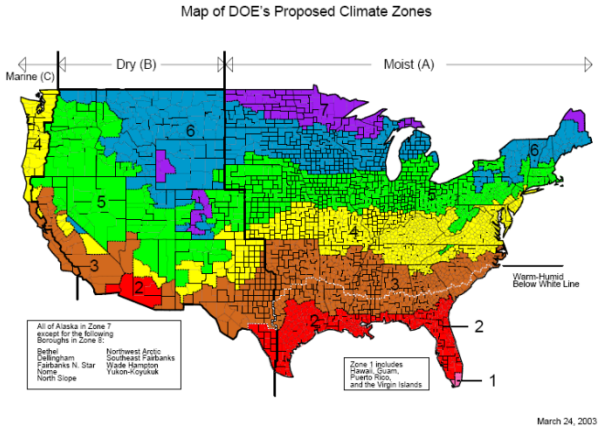
# Window Choice Resources




US Department of Energy

- Selecting new energy-efficient windows, http://www.energysavers.gov/your_home/windows_doors_skylights/index.cfm/mytopic=13340
- Guide to Energy Efficient Windows, http://www.energysavers.gov/pdfs/guide_to_energy_efficient_windows.pdf

Efficient Windows Collaborative

- http://www.efficientwindows.org/

EPA

- U.S. EPA Facilities Manual Volume 2: Architecture and Engineering Guidelines, Addendum 1, (2006) http://www.epa.gov/oaintrnt/documents/ae_addendum1_508.pdf 36)
- Residential Green Building Guide: A Web Source Book for The Pacific Northwest and Alaska (2009), EPA 910-K-09-006, http://yosemite.epa.gov/R10/EXTAFF.NSF/programs/greenbuilding/$FILE/green-building-guide_epa10_sept09.pdf
- Energy Star – Climate Zones Website: http://www.energystar.gov/index.cfm?c=windows_doors.pr_crit_windows

FSEC

- Q&A Residential Window Replacement, http://www.fsec.ucf.edu/en/consumer/buildings/homes/windows/q_a.htm Provides advice to homeowners on selecting window replacements

NAHB

- Window selection: modern windws… http://www.toolbase.org/Home-Building-Topics/Energy-Efficiency/window-selection

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# Retrofit Scenarios

| | Cladding Replaced | Cladding Not Replaced | Over-Cladding |
|---|---|---|---|
| **Windows Not Replaced** | General inspection – replace damaged materials<br><br>Install or replace WRB/air barrier and integrate into existing flashing (if exists.) | Retrofit in Place | General inspection – replace damaged materials<br><br>Install or replace WRB/air barrier and integrate into existing flashing (if exists.)<br><br>New trim to accommodate “fatter” walls. |
| **Windows Replaced** | New Construction Guidelines | Method depends on situation | New Construction Guidelines<br><br>New trim design to accommodate “fatter” walls. |

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| **Windows Replaced** | New Construction Guidelines<br><br>**•Adding shading**<br>**•Caulking and weather stripping**<br>**•Storm windows** | Method depends on situation | New Construction Guidelines<br><br>New trim design to accommodate "fatter" walls. |

**Retrofit in Place**

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| **Windows Replaced** | Same as new construction guidelines | Method depends on situation | Same as new construction guidelines<br><br>New trim design to accommodate "fatter" walls. |

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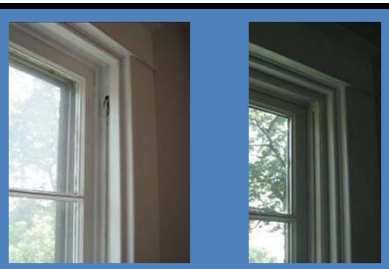

## Replace sash only

- Water management is not changed by retrofit
- Repair any damage to window frame.
- Air and water seal interior of window frame to the degree possible

## Replace window, water-resistive barrier intact and accessible

- Air and water seal the rough opening. A liquid applied flashing material that meets AAMA 714-11 is recommended.
- Integrate flashings with existing water-resistive barrier.
- Install an interior air/water seal through the use of backer rod and sealant or low expansion foam around the entire interior perimeter of the window

## Replace window, no water-resistive barrier intact or water-resistive barrier inaccessible

- Air and water seal the rough opening. A liquid applied flashing material that meets AAMA 714-11 is recommended.
- Install sill flashing to a ‘through cavity’ flashing component that is sloped to the exterior and a directed over the cavity between the frame and the exterior cladding. The drainage component of the flashing is directed to the exterior of the cladding.
- Install an interior air/water seal through the use of backer rod and sealant or low expansion foam around the entire interior perimeter of the window

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## Window Retrofit Guide is a work in progress.


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